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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/685,042	10/10/2000	Shuichi Kobayashi	35.G2657	3110
5514	7590	06/07/2004	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO			CHANG, AUDREY Y	
30 ROCKEFELLER PLAZA			ART UNIT	PAPER NUMBER
NEW YORK, NY 10112			2872	

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/685,042

Applicant(s)

KOBAYASHI, SHUICHI

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,7,11,13,15 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,7,11,13,15 and 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 2872

DETAILED ACTION

1. This Office Action is also in response to applicant's amendment filed on March 24, 2004, which has been entered into the file.
2. By this amendment, the applicant has amended claims 1 and 11 and has added new claims 19-21.
3. Claims 1, 4, 7, 11, 13, 15, and 17-21 remain pending in this application.
4. The rejections to claims 1, 4, 7, 11, 13, 17 and 18 under 35 USC 112, first paragraph, set forth in the previous Office Action.

Response to Amendment

5. The amendment filed on March 24, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **Claims 1 and 11 have been amended** to include the feature "the first diffraction part reduces the incident angle of a **principle** ray which is incident on said second diffraction part". The specification teaches about "*a ray of off-axis primary light*" but does not teach about "*principle ray*". The applicant is respectfully reminded that a *ray of off-axis primary light* as shown in Figures 3 and 5 is **not** a principle ray. Please check standard textbook for the definition of principle ray. The off-axis light ray as shown in Figures 3 and 5, does not pass through principle points of the layered diffraction optical member.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2872

7. **Claims 1, 4, 7, 11, 13, 17-18 and newly added claims 19-21 are rejected under 35 U.S.C. 112, first paragraph**, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection are based on the newly added matters set forth in the paragraph above.

The specification and the claims further fail to teach how could the first diffraction part *reduces* the incident angle of a principle ray which is incident on second diffraction part. It is known in the art that the in general, an optical element with *positive* power will *converge* light ray toward the optical axis and an optical element with *negative* power will *diverge* light away from to the optical axis. The incident angle of light ray on an optical element depends on *direction* of the light ray travels and is *measured* with respect to the **surface normal** of the element, which therefore implicitly depends on the *curvature* of the element, (in this case the second diffraction part). If the first diffraction part has *negative* power, the light ray will be diverged away from the original light path, and as it incidents on the second diffraction part, depends on the angles of refraction and diffraction and the asymmetric shape of the first diffraction part and also depends on the curvature of the second diffraction part, the incident angle on the second diffraction part can be increased or decreased. If the first diffraction part has a *positive* power, the light ray will be *converged* toward the optical axis, it does not seem to be possible for the light ray particularly the off axis ray after being converged by the positive first diffraction part to reduce the angle of incident as it incidents on the second diffraction part, since the converging property will always makes the light ray to have a larger angle with respect to the optical axis. The specification and the claims seem to fail to provide the critical elements or criterions to enable the layered diffraction optical member to enable the incident angle of a *principle ray* on the second diffraction part be reduced, as claimed. Furthermore, as demonstrated by the Figures 3 and 5, the light ray incidents on the first diffraction part **does not seem to**

Art Unit: 2872

have incident angle between *plus and minus 6 degrees* which seems to be part of criteria for the claimed feature to be achieved.

Claim Objections

8. Claims 19-20 are objected to because of the following informalities:

(1) The phrase "the object side" recited in claim 19 and the phrase "the image side" recited in claim 20 are confusing and indefinite since they each lack proper antecedent basis from their respective based claim and the based claims fail to define "object side" and "image side".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 4, 7, and newly added claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Mukai et al (PN. 6,052,234) in view of the patent issued to Ishii (PN. 6,157,488).

The reasons for rejection are set forth in the previous Office Action.

Claim 1 has been amended to include the feature that the optical system is an imaging optical system. Mukai et al teaches that the real image viewfinder optical system can be used in a camera, which is an imaging optical system, (please see column 1).

Claim 1 has been amended to include the feature that the first diffraction part reduces the incident angle of the principle ray as it incidents on the second diffraction par. The feature concerning the

Art Unit: 2872

“principle ray” is rejected under 35 USC 112, first paragraph, for the reasons stated above. Nevertheless, as demonstrated by Mukai et al in Figure 7, the off axis light ray passes through first diffractive part (S2) is *diverged* toward the second diffraction part wherein the incident angle of the light ray is reduced by the first diffraction part, (please see the most diverged light ray in the off axis position).

With regard to claim 19, as shown in Figure 7 of Mukai et al, there is no lens present on the object side of the objective optical system (tg).

With regard to claim 20, as shown in Figure 10, there is refractive optical element on the image side of the pupil.

10. **Claims 11, 13, 15, 18 and newly added claim 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ushida et al (PN. 5,636,000) in view of the patent issued to Ishii (PN. 6,157,488).**

The reasons for rejection are set forth in the previous Office Action.

Claim 11 has been amended to include the feature for reducing the angle of incidence, by the first diffraction part, of the principle ray as it incidents on the second diffraction part. This feature is rejected under 35 USC 112, first paragraph, for the reasons stated above. This feature cannot be further examined since it does not seem to be physical possible.

With regard to claim 21, **Ushida et al** teaches that the projection optical system is used in an exposure system but it does not teach explicitly that it is used as an imaging optical system. However the projection system is capable of transferring image light from a plane (R), which can serve as an object plane, to form focused image light at a wafer plane (W) which can serve as image plane, this optical system therefore can certainly be used in an imaging system. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the

Art Unit: 2872

claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

Response to Arguments

11. Applicant's arguments filed on March 24, 2004 have been fully considered but they are not persuasive. The newly amended claims and newly added claims have been fully considered and they are rejected for the reasons stated above.

12. In response to applicant's arguments concerning the "a ray of off-axis primary light", the examiner wishes to point out respectfully that such ray is not a principle ray and it still does not overcome the rejection under 35 USC 112, first paragraph, for the reasons stated above.

13. In response to applicant's arguments concerning the "pupil" of the cited Mukai et al reference, the applicant is respectfully reminded that Mukai et al teaches **explicitly** that the pupil is at position (he, Figure 7). Please see column 12, lines 43-44). This makes the disclosure reads on the limitations "'said layered diffraction optical member is provided in front of *a pupil*'" as in claim 1.

14. In response to applicant's arguments, which state that there is no motivation for combining the cited Ushida et al reference with Ishii reference to modify the optical system to be used in visible wavelength range, the examiner respectfully disagrees for the reasons stated below. Firstly, *conventional* exposure optical system for transferring information to *semiconductor wafer* uses **both** visible light and ultraviolet light as light source. Secondly, the essential criterion for the optical system to be used in visible light range or in ultraviolet light range is to choose the desired materials for the elements in the optical system and to design the elements with proper curvature and specifics, both the cited Ushida et al and Ishii references teach such explicitly, which makes it possible for one skilled to use the projection optical system in either ultraviolet or visible light range, as desired. The motivation is therefore the design choice of one skilled in the art to use either light sources pleased.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

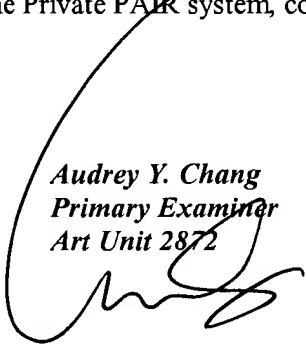
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2872

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.